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The Distribution of Pollock (*Pollachius virens*) in NAFO Subdivision 3Ps

Aire de répartition de la goberge (*Pollachius virens*) dans la sous division 3Ps de l'OPANO

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Abstract

Pollock has played a minor role in the groundfish fishery in NAFO subdivision 3Ps. In recent years the species has not occurred in sufficient numbers to warrant a directed fishery. This document summarizes available research data on the abundance and distribution of Pollock (*Pollachius virens*) in NAFO Subdivision 3Ps. Abundance and distribution is determined based on a time series of research vessel surveys conducted in the area by Canada from 1972 -2002.

Résumé

La goberge a joué un rôle peu important dans le cadre de la pêche du poisson de fond dans la sous-division 3Ps de l'OPANO. Au cours des dernières années, cette espèce n'a pas été observée en nombre suffisant pour justifier une pêche dirigée. Ce document présente un résumé des données disponibles sur l'abondance et la répartition de la goberge (*Pollachius virens*) dans 3Ps, ces données étant tirées d'une série de relevés de navires de recherche effectués par le Canada dans 3Ps, de 1972 à 2002.

INTRODUCTION

In southern Newfoundland waters pollock are clearly at the northern extent of their range. There is very little known about the biology and life history of pollock in the area. Much of the information on spawning and habitat preference is inferred from studies on more abundant stocks to the south. Questions have been raised as to whether the pollock in subdivision 3Ps constitute a separate stock or whether it is a northward extension of the Scotian Shelf stock (NAFO divisions 4VWX and subdivision 5Zc).

1. The Fishery

The fishery in this area has generally been a bycatch fishery with a substantial portion of the catch being taken in the ottertrawl, gillnet and trap fisheries for cod. Prior to 1960 catch statistics were compiled on an area basis so breakdown for division and subdivision are not available. Catch in the 1950's for NAFO Sub area 3 averaged 5,500 t. Catches of pollock in Subdivision 3Ps have been generally low, declining from 4500 t in 1960 to a low level of less than 1000 t for the 1967-1982 period. Catches gradually increased thereafter, peaking at 7,500 t in 1986, but have since declined to pre-1980 levels. Catches since the cod fishery reopened in 1997 have increased slightly, but remain less than 1,000 t annually (Table 1, Fig. 1).

2. Research Survey

Due to the pelagic nature of pollock, research vessel (bottom trawl) surveys may not give a reliable index of abundance or biomass however these surveys are the only research information available for this species.

Canada has conducted research vessel surveys in NAFO subdivision 3Ps using the stratified random design since 1972 (Figure 2). Surveys were conducted mainly in the February – March period prior to 1993 but since then have been conducted in April.

The vessel and gear used to conduct the survey have changed over time. The A. T. Cameron conducted surveys from 1972-1983 using the Yankee 41.5 ottertrawl, from 1983 to 1995 the Wilfred Templeman or its sister ship the Alfred Needler conducted the survey using the Engel 145 hi-rise ottertrawl. Since 1996 the Wilfred Templeman has conducted the survey using the Campelen 1800 shrimp trawl. The changes in gears means estimates of abundance and biomass (Tab. 2, Fig. 3) derived during the various periods are not comparable. Insufficient data were available from comparative fishing experiments to provide conversion factors for pollock.

A.T. Cameron Surveys 1972-1983

Coverage in the surveys in the early 1970's was minimal and estimates of pollock were low. Pollock were found in small numbers on Burgeo Bank and along the western and southern slopes of St. Pierre Bank (Fig. 4). For the 1977 -1983 period coverage improved, pollock were slightly more abundant and resulted in average abundance and biomass estimates for this period of 0.6 million fish at 1,396 t. Pollock were distributed on Burgeo Bank and to a lesser extent on the western and southern slopes of St. Pierre Bank (Fig.5-6, Tab. 2).

Wilfred Templeman /Alfred Needler Engels Surveys 1984-1995

Surveys in the mid 1980's showed pollock to be relatively more abundant. During this period surveys encountered a few larger catches in the Burgeo Bank area with smaller catches along the slopes of St. Pierre Bank. These larger catches resulted in abundance and biomass estimates averaging 2.2 million fish at 3,755 t peaking with a 1987 estimate of 4 million fish at 7,877 t (Fig. 7). Surveys in the 1988 -1991 period showed pollock to be more widely distributed with no large catches (Fig 8). Resultant abundance and biomass estimates were 0.9 million fish at 1,873 t. Surveys in the early 1990's showed few pollock resulting in average abundance and biomass of 0.2 million fish at 522 t. Surveys during this period found very few pollock in the Burgeo Bank and western St. Pierre Bank area and a few small catches along slopes of St. Pierre Bank (Fig.9).

Wilfred Templeman Campelen Surveys 1996-2002

Surveys in the mid to late 1990's caught very few pollock and no pollock were encountered in the Burgeo Bank and western slopes of St. Pierre Bank. A few larger catches were encountered in the Halibut Channel area (Fig. 10) in 1999 giving the highest abundance and biomass estimate of 2 million fish at 5,709 t, the highest since 1987. Resultant average abundance and biomass estimates for 1996 -1999 period were 0.6 million fish at 1,573 tonnes.

Surveys in 2000-2002 showed varied results, the survey in 2000 encountered a few small catches in the Burgeo Bank area. The 2001 showed catches of pollock in the Burgeo Bank area and along the western slopes of St. Pierre Bank, the southern slope of St. Pierre Bank. In the 2002 survey catches were low to non-existent in offshore strata. Abundance and biomass estimates for 2000 and 2001 were 5 million fish at 961 t and 2 million fish at 744 t respectively.

Inshore strata

In 1997 strata were added in the inshore area in Fortune Bay and in inshore areas westward to the 3Pn line. During the 1997-2000 period no significant catches of pollock were encountered in these strata (Fig. 10 +11).

In 2002 the only significant catches of Pollock occurred in the inshore strata in Fortune Bay and inshore strata west of Fortune Bay (Fig. 11). There has been overall increasing trend in abundance and biomass in inshore strata in recent years (Fig.12).

3. Comments

One of the major questions related to pollock in NAFO subdivision 3Ps is whether the population in the area constitutes a stock. Indices for pollock indicate it is present in the area in both the winter and spring portions of the time-series. Catches though low are recorded in the area in all months (Fig 13). Pollock is obviously not an incidental visitor to the region. Pollock of all sizes are encountered in the area. Surveys catch pollock of various stages of maturity, from maturing to spent.

On an environmental point NAFO subdivision 3Ps is at the northern extent of the species range. Pollock avoid the colder waters on the top of St. Pierre and Burgeo Banks preferring the warmer slope waters and venturing into inshore waters as they warm during the summer.

Table 1. Catches (t) of Pollock in NAFO Subdivision 3Ps in the period 1960-2002

Year	Canada MQ	Canada N	Canada Total	France Total	Other ¹	Non Canadian Total	Total	TAC
1960	243	259	502		4019	4019	4521	
1961	133	414	547	69	2048	2117	2664	
1962	130	419	549	39	503	542	1091	
1963	53	402	455	34	280	314	769	
1964	21	244	265	138	357	495	760	
1965	16	162	178	91	332	423	601	
1966	1	232	233	10	283	293	526	
1967	31	163	194	20	403	423	617	
1968	29	80	109	6	330	336	445	
1969	2	62	64	8	115	123	187	
1970	22	61	83	1	378	379	462	
1971	1	76	77	1	198	199	276	
1972	76	78	154	4	153	157	311	
1973	6	115	121		145	145	266	
1974	40	94	134	15	69	84	218	
1975	5	95	100	23		23	123	
1976	4	65	69	35	33	68	137	
1977	611	224	835	4		4	839	
1978	253	177	430	2		2	432	
1979	520	198	718	59		59	777	
1980	83	467	570	94		94	664	
1981	48	198	246	42		42	288	
1982	96	338	434	336		336	770	
1983	157	772	929	181		181	1110	
1984	608	711	1319	497		497	1816	
1985	704	624	1328	956		956	2284	
1986	2106	3294	5400	2090	62	2152	7552	
1987	88	2223	2311	2760		2760	5071	1500
1988	164	1588	1752	2514		2514	4266	5400
1989	1024	1135	2159	1145		1145	3304	5400
1990	513	1068	1581	438		438	2019	5400
1991	51	1211	1262	42		42	1304	5400
1992	19	456	475			0	475	5400
1993	25	112	137			0	137	600
1994	34	59	93			0	93	500
1995	32	258	290			0	290	100 ²
1996	6	435	441			0	441	100 ²
1997	2	592	594	14		14	608	1500 ²
1998	13	626	639	18		18	657	1500 ²
1999	7	457	464	5		0	464	
2000	117	710	826			0	826	
2001	13	812	824			0	824	
2002	34	419	453			0	453	

¹ Catches by others mostly Spain

² bycatch

Table 2. Mean number and weight per standard tow from Canadian research vessel surveys in NAFO Subdivision 3Ps (1 Std = 1 standard deviations)

Year	1977	1978	1979	1980	1981	1982	1983	1984
Mean date	20-Apr	24-Feb	28-Feb	28-Mar	14-Mar	4-Jun	2-May	13-Apr
sets	102	105	81	81	71	82	171	95
Mean no./tow	0.25	0.18	0.5	0.59	1.23	0.49	0.34	0.42
1Std	0.2	0.13	0.94	5.63	4.8	0.32	0.22	0.42
Mean wgt/ tow	0.59	0.28	1.03	1.29	3.3	1.05	0.87	0.68
1Std	0.77	0.22	1.76	12.43	12.74	1.62	0.7	2.58
Abundance (000's)	146	295	381	761	1538	632	450	453
Biomass (t)	342	383	782	1667	4112	1338	1149	738
Year	1985	1986	1987	1988	1989	1990	1991	1992
Mean date	14-Mar	16-Mar	16-Mar	1-Feb	7-Feb	13-Feb	12-Feb	19-Feb
sets	112	145	135	152	157	109	164	147
Mean no./tow	2.49	1.19	135	0.95	0.88	0.35	0.15	0.42
1Std	25.87	0.69	6.59	0.41	0.33	0.2	0.08	4.4
Mean wgt/ tow	3.16	2.05	6.02	1.75	1.77	0.73	0.27	1.06
1Std	31.33	0.88	11.27	1.6	0.57	0.42	0.19	11.76
Abundance (000's)	2931	1556	4003	1241	1161	423	204	544
Biomass (t)	3716	2692	7877	2302	2324	885	355	1388
Year	1993	1994	1995	1996	1997	1998	1999	2000
Mean date	12-Apr	16-Apr	17-Apr	20-Apr	12-Apr	19-Apr	23-Apr	21-Apr
sets	138	172	164	148	158	177	175	171
Mean no./tow	0.06	0.08	0.13	0.11	0.10	0.02	0.76	0.09
1Std	0.14	0.04	0.33	0.26	0.08	0.04	1.54	0.03
Mean wgt/ tow	0.13	0.17	0.34	0.14	0.05	0.02	2.09	0.18
1Std	0.3	0.19	0.87	0.36	0.21	0.03	4.52	0.06
Abundance (000's)	76	112	183	265	145	67	2081	234
Biomass (t)	166	244	458	331	204	50	5709	474
Year	2001	2002						
Mean date	18-Apr	15-Apr						
sets	174	177						
Mean no./tow	1.92	0.79						
1Std	0.69	0.66						
Mean wgt/ tow	0.35	0.27						
1Std	0.15	0.16						
Abundance (000's)	5197	2133						
Biomass (t)	961	744						

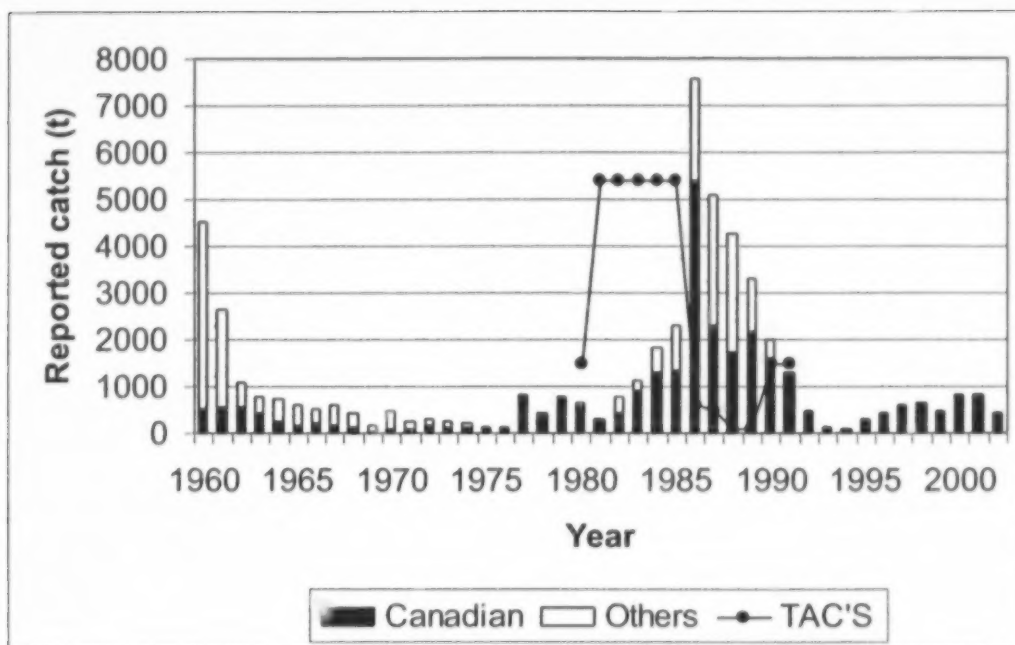


Fig. 1 Pollock landings and Total Allowable Catch in NAFO subdivision 3Ps 1960-2002.

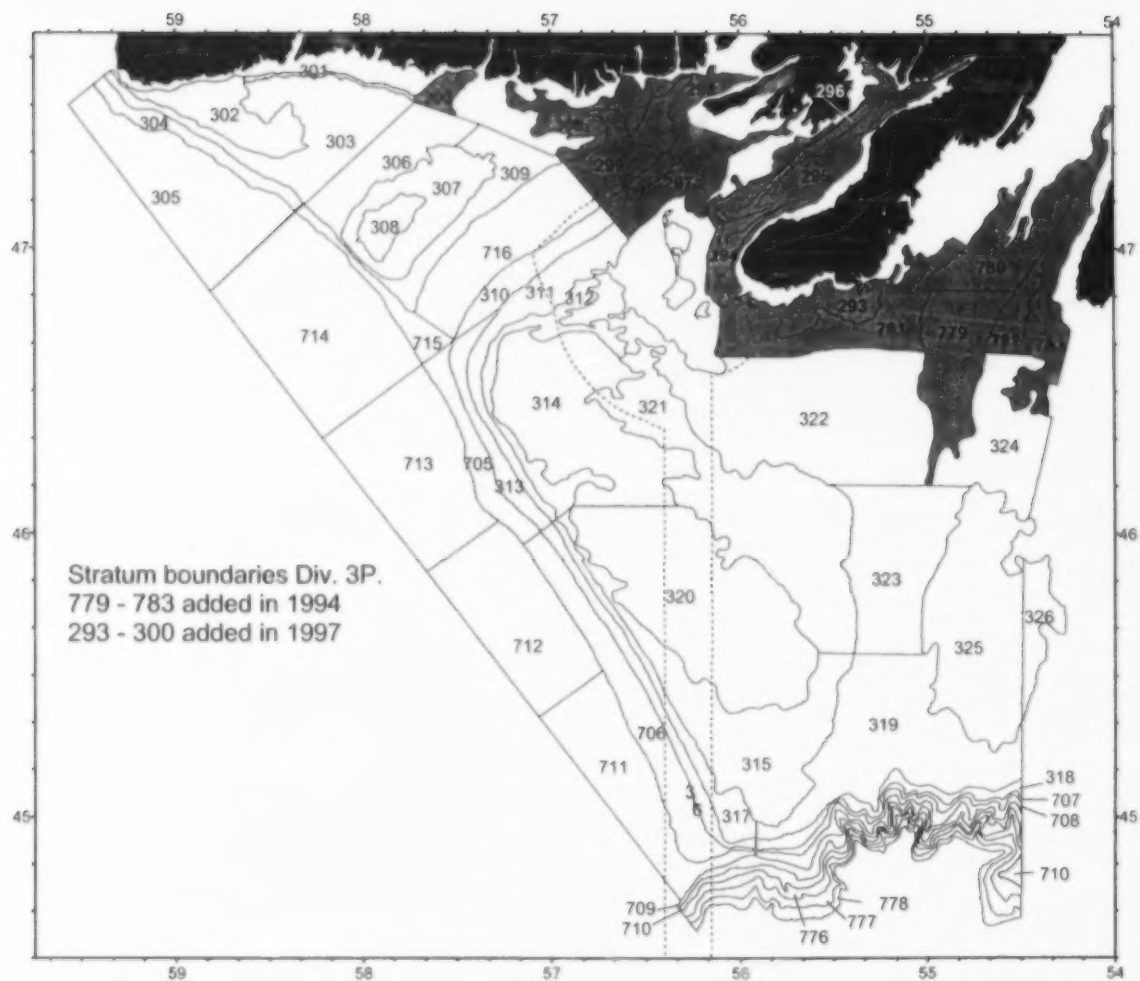


Fig. 2 Stratum area boundaries and area surveyed during the DFO research vessel bottom-trawl survey of NAFO Subdiv. 3Ps. Dashed line is the boundary of the French economic zone which is included in the surveyed area.



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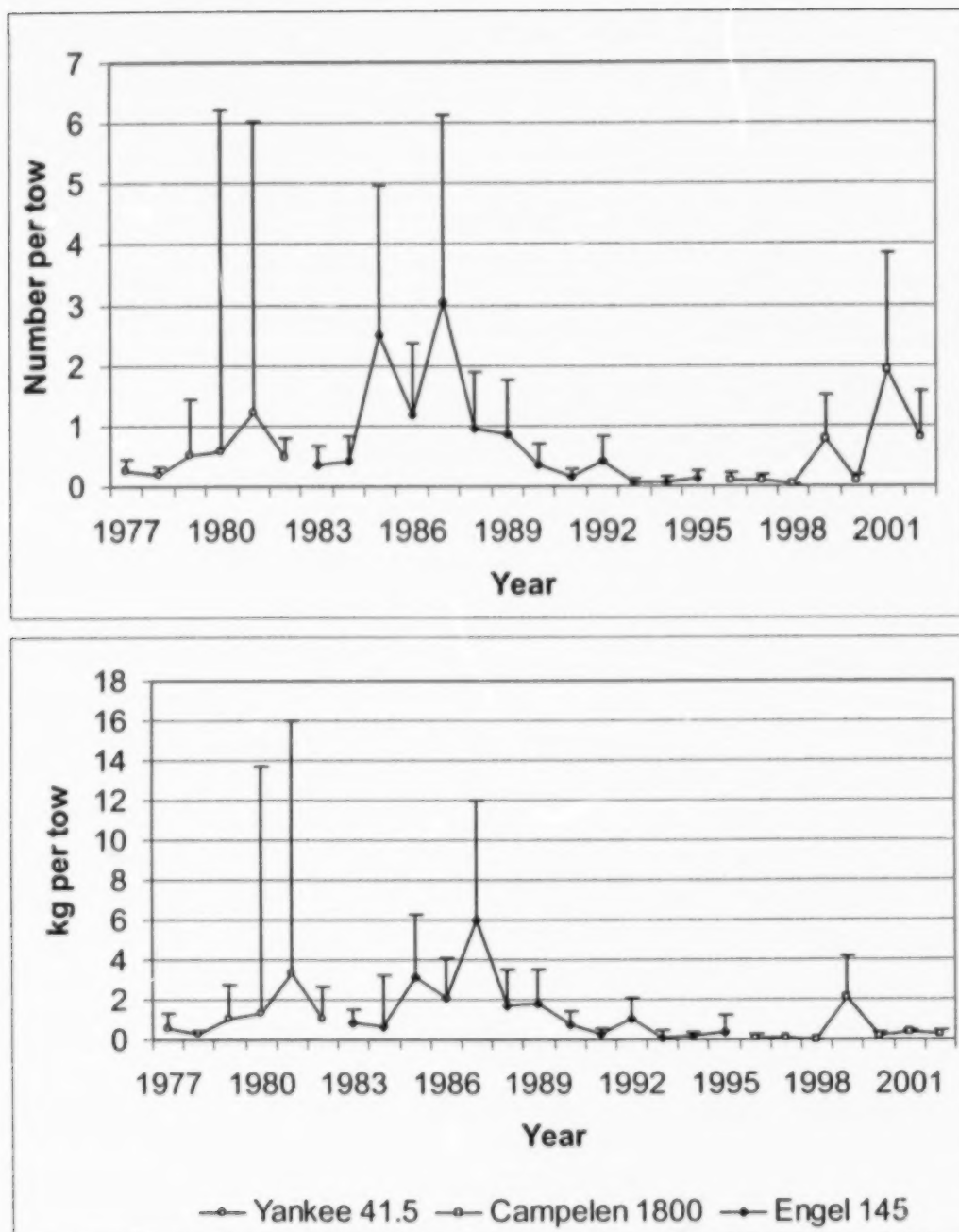


Fig. 3 Abundance and biomass indices for pollock in NAFO Subdivision 3Ps from DFO research vessel bottom trawl surveys during winter/spring from 1977-2002.

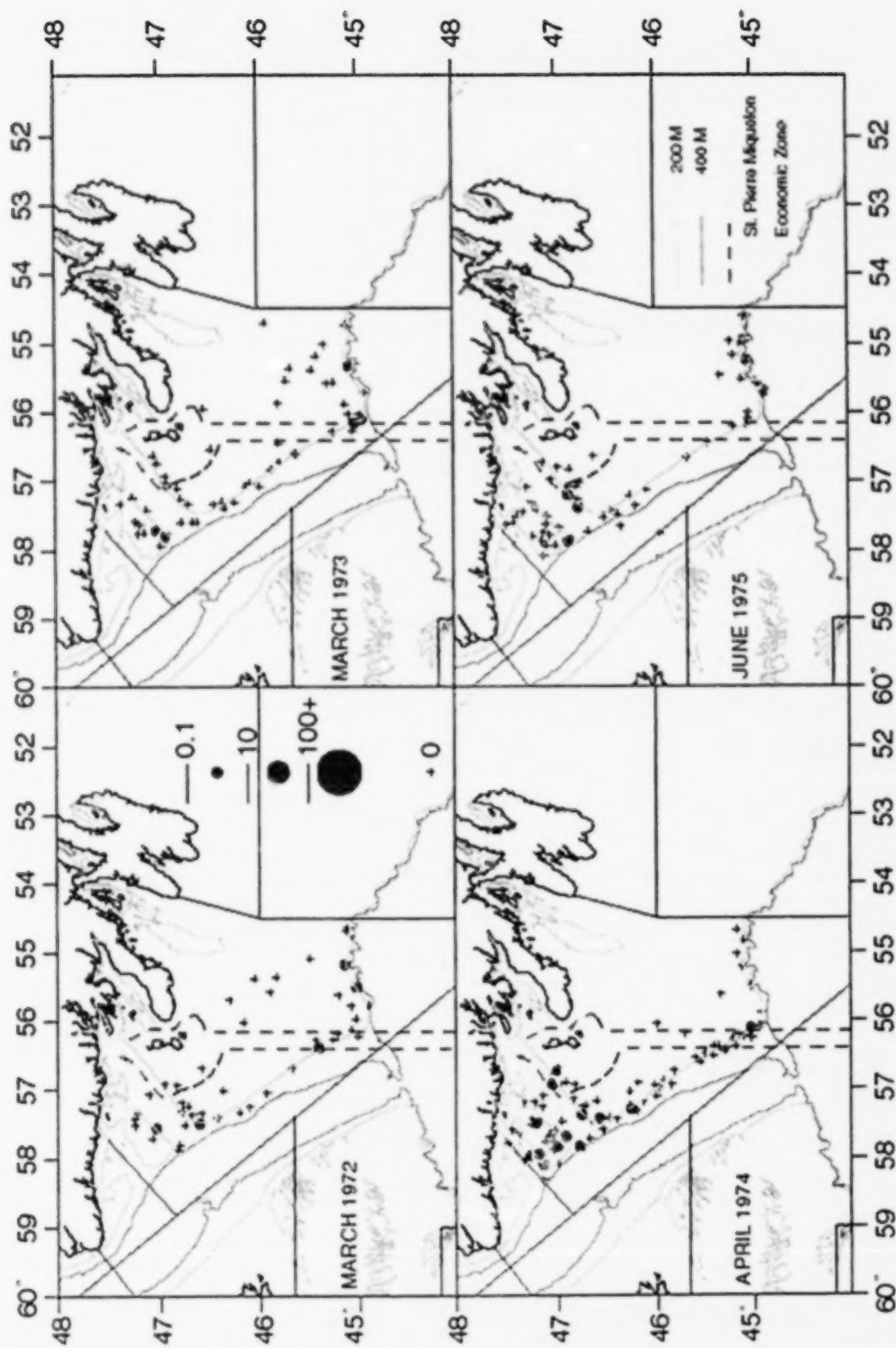


Fig 4. Pollock distribution in NAFO Subdivision 3Ps. Number per 30 minute tow using the Yankee 41.5 Otter trawl 1972 - 1975.

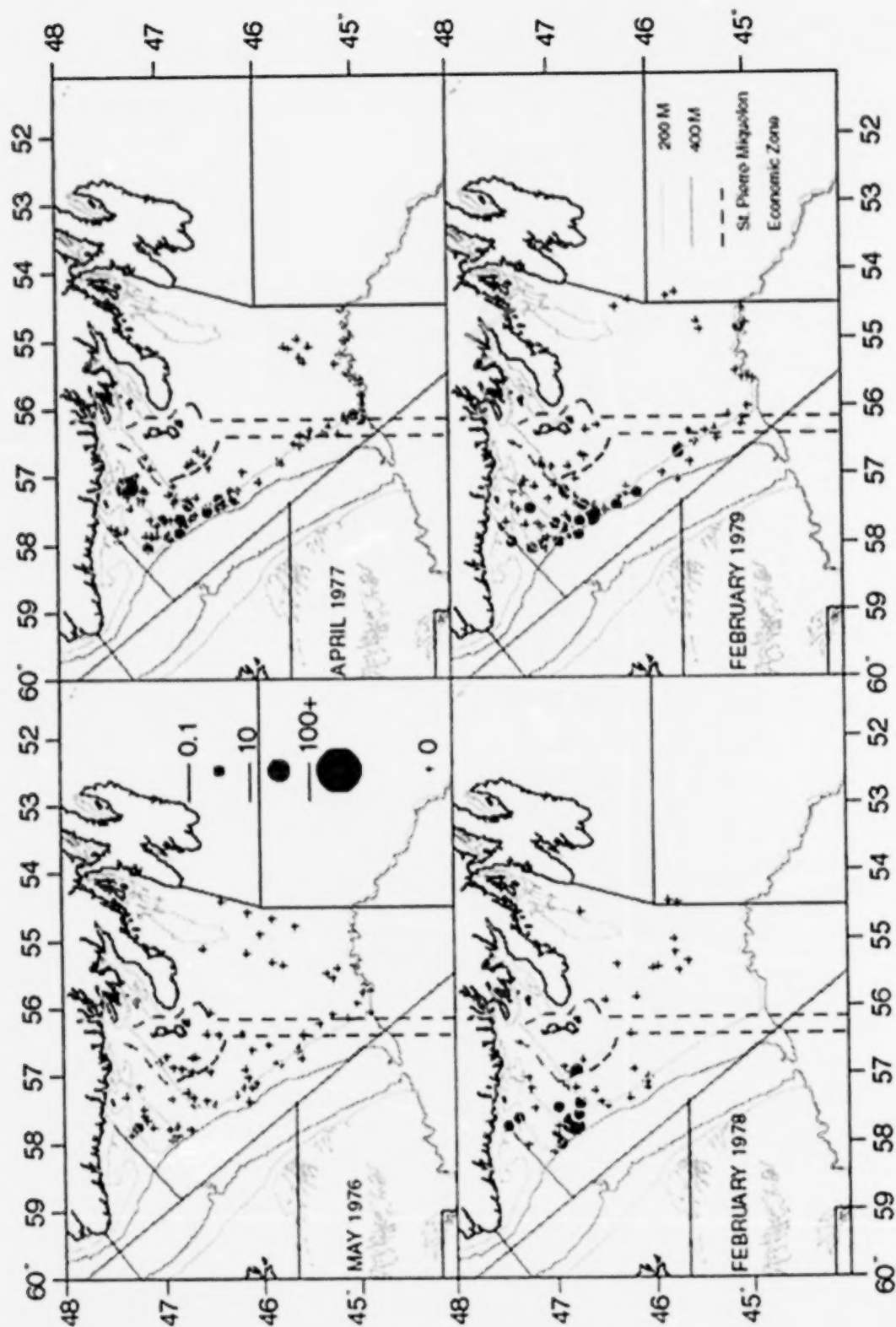


Fig 5. Pollock distribution in NAFO Subdivision 3Ps. Numbers per tow using the Yankee 41.5 Otter trawl 1976-1979.

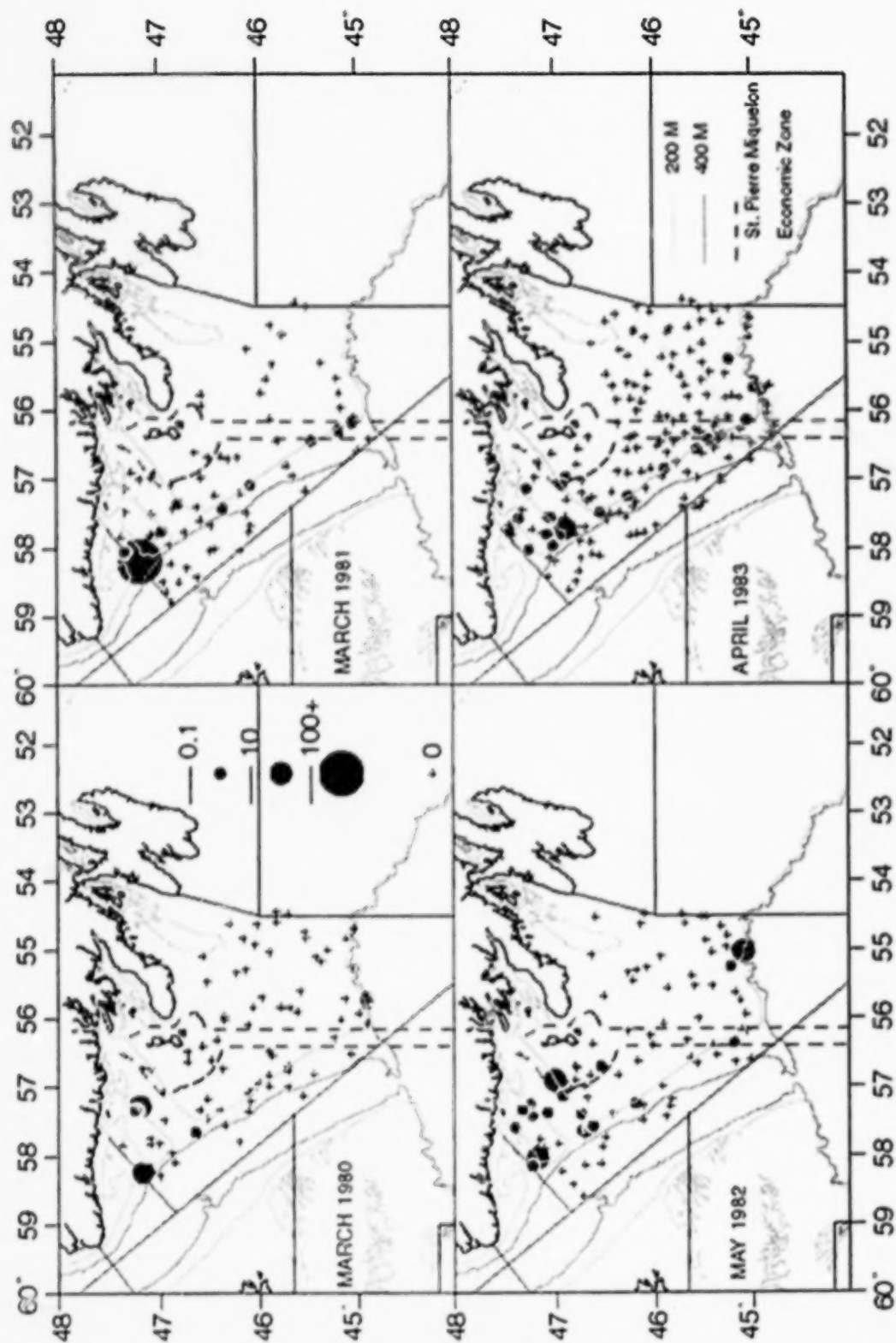


Fig 6. Pollock distribution in NAFO Subdivision 3Ps. Number per 30 minute tow using the Yankee 41.5 Otter trawl 1980-1982 and the Engels 145 otter trawl in 1983.

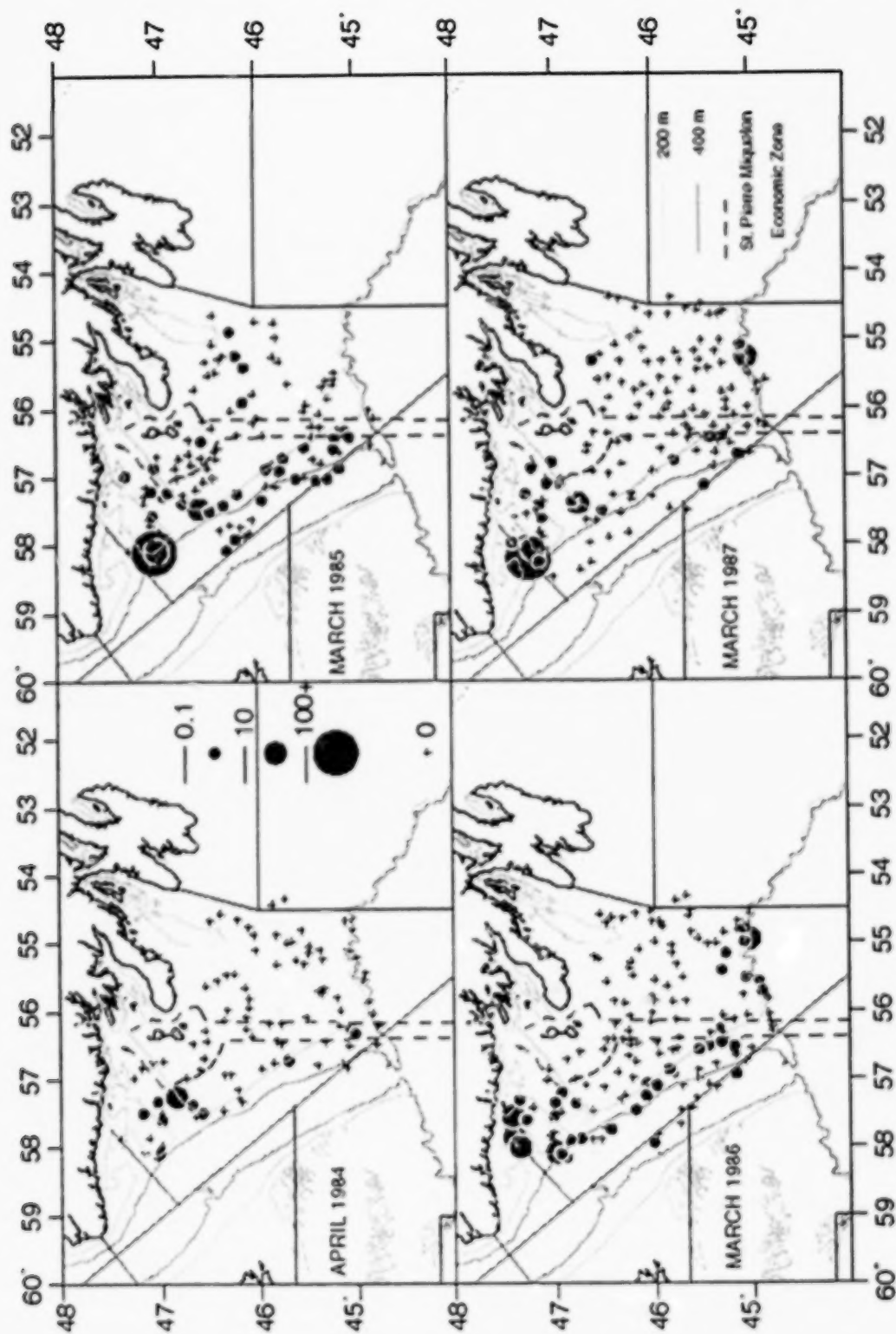


Fig 7. Pollock distribution in NAFO Subdivision 3Ps. Number per 30 minute tow using the Engels 145 Otter trawl 1984-1987.

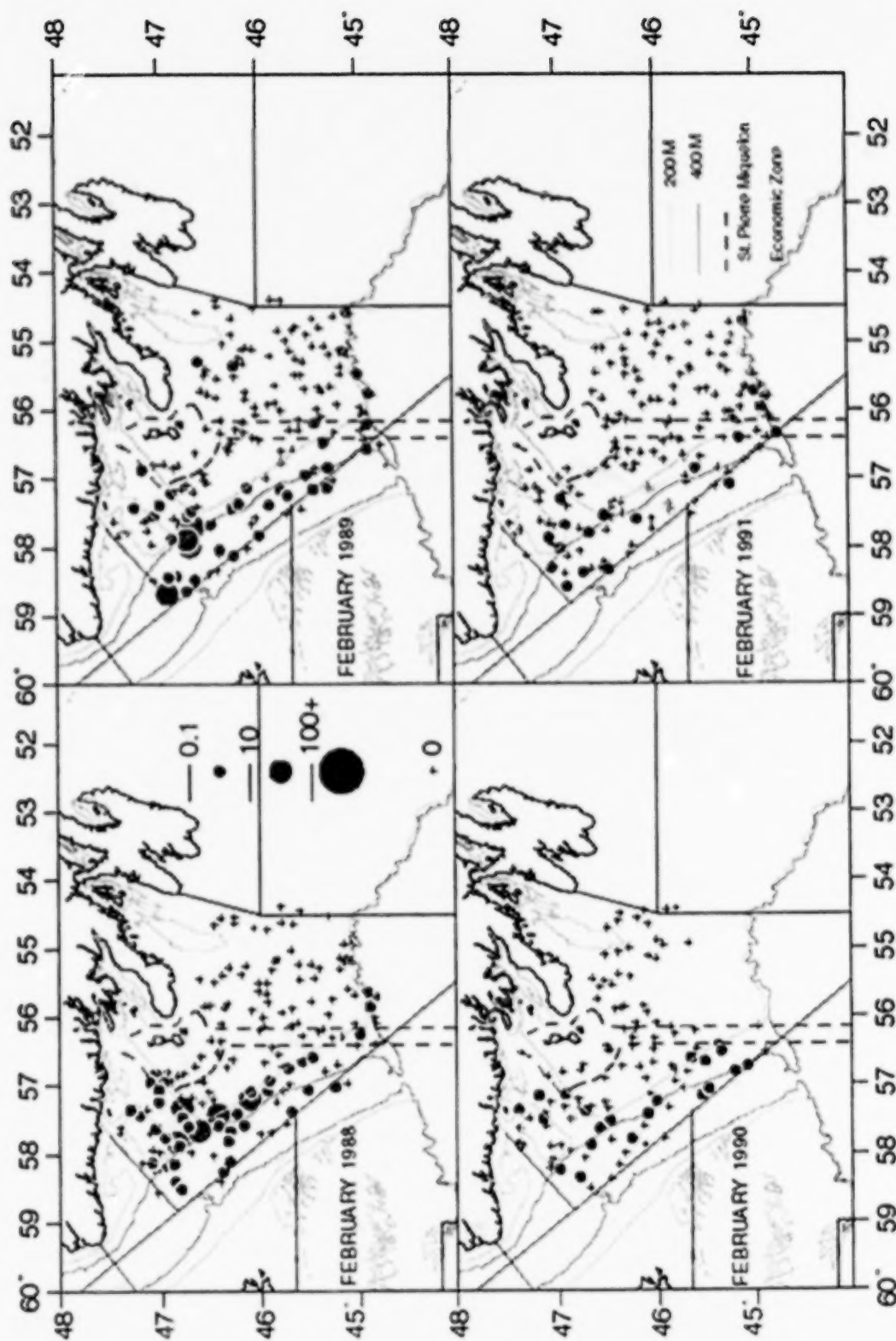


Fig 8. Pollock distribution in NAFO Subdivision 3Ps. Number per 30 minute tow using the Engles 145 Otter trawl 1988-1991.

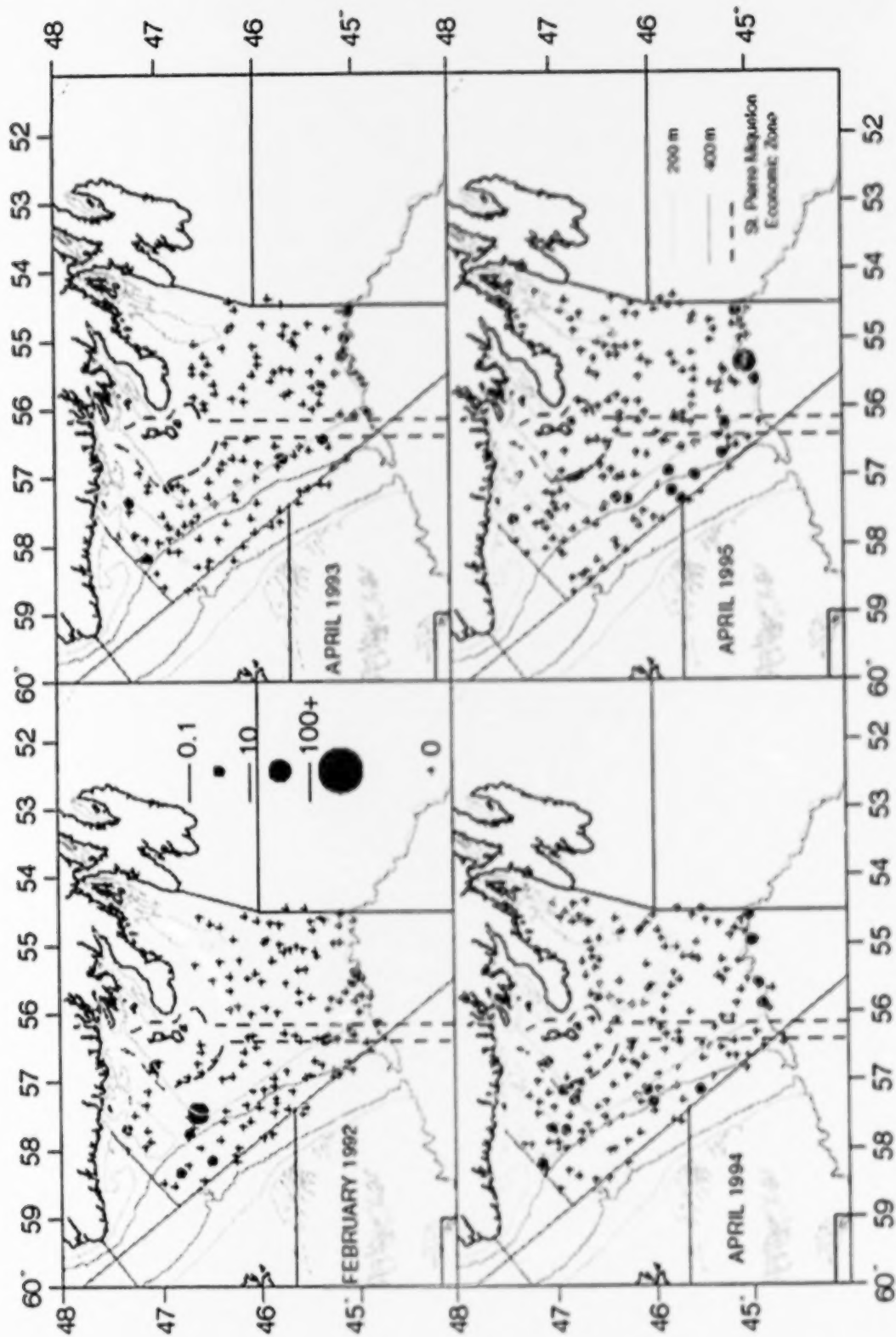


Fig 9. Pollock distribution in NAFO Subdivision 3Ps. Numbers per 30 minute trawl using the Engels 145 Otter trawl 1992-1995.

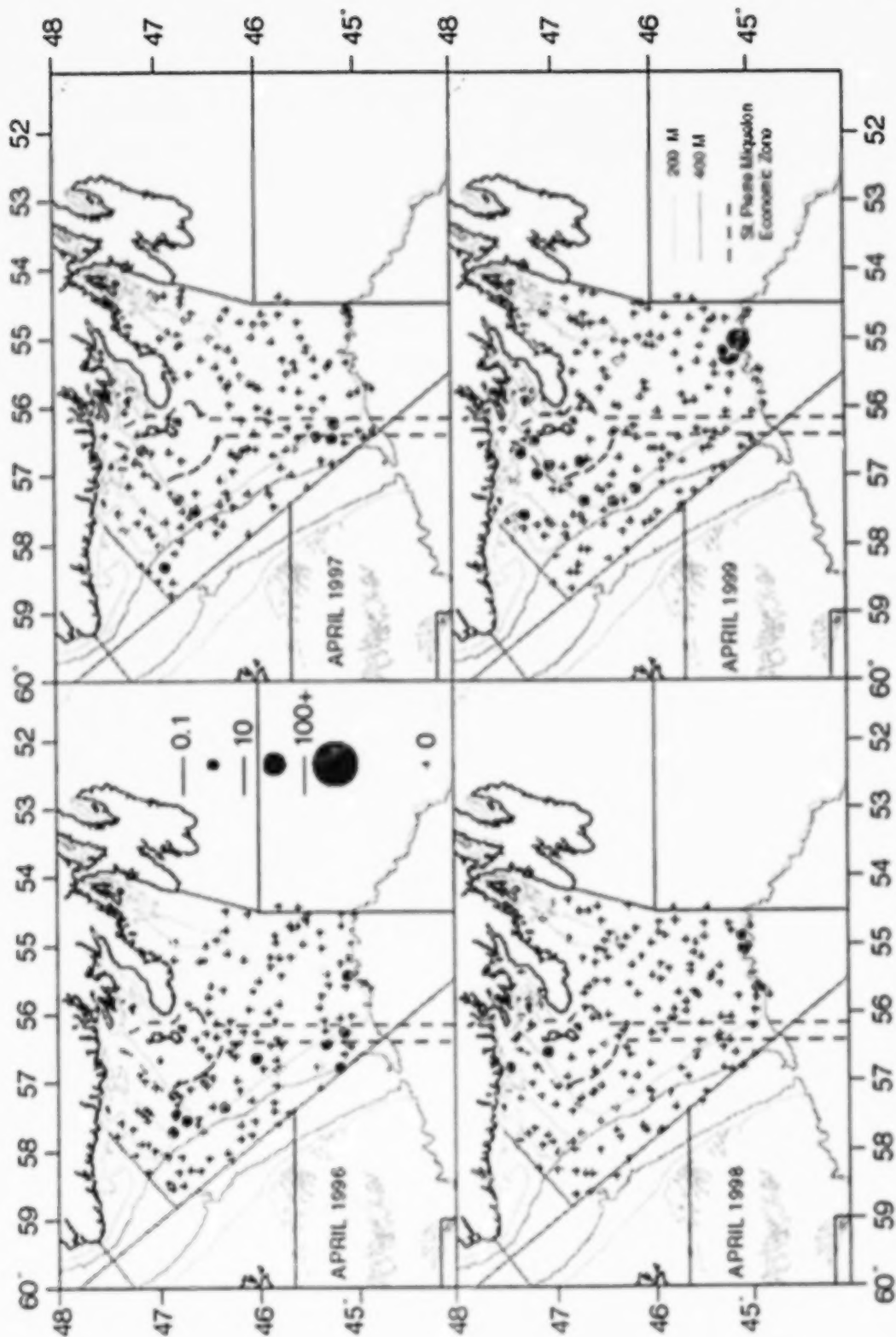


Fig. 10. Pollock distribution in NAFO Subdivision 3Ps. Number per 15 minute tow using the Campelen 1900 shrimp trawl 1996-1999.

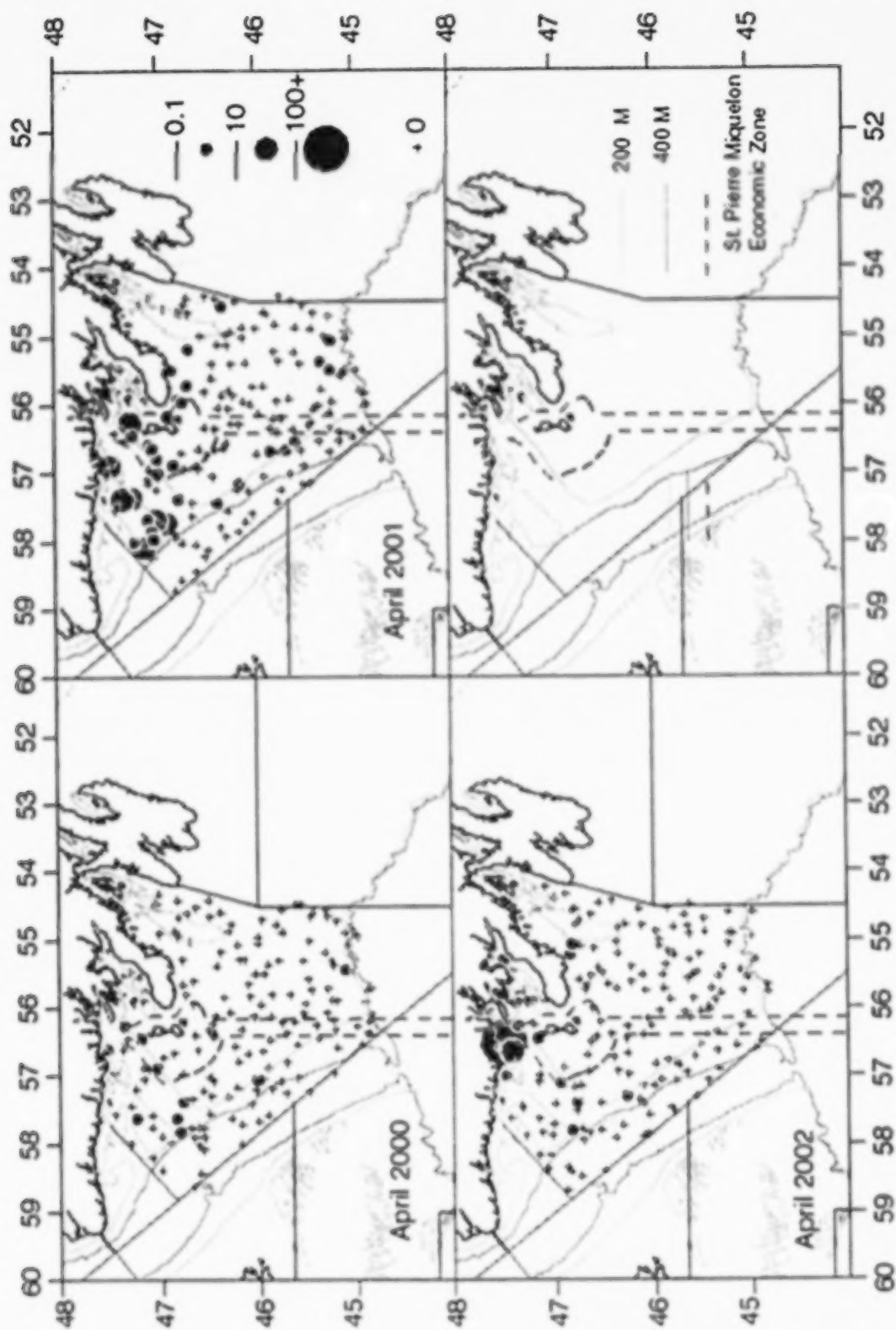


Fig 11. Pollock distribution in NAFO Subdivision 3Ps. Number per 15 minute tow using Campelen 1800 shrimp trawl 2000-2002.

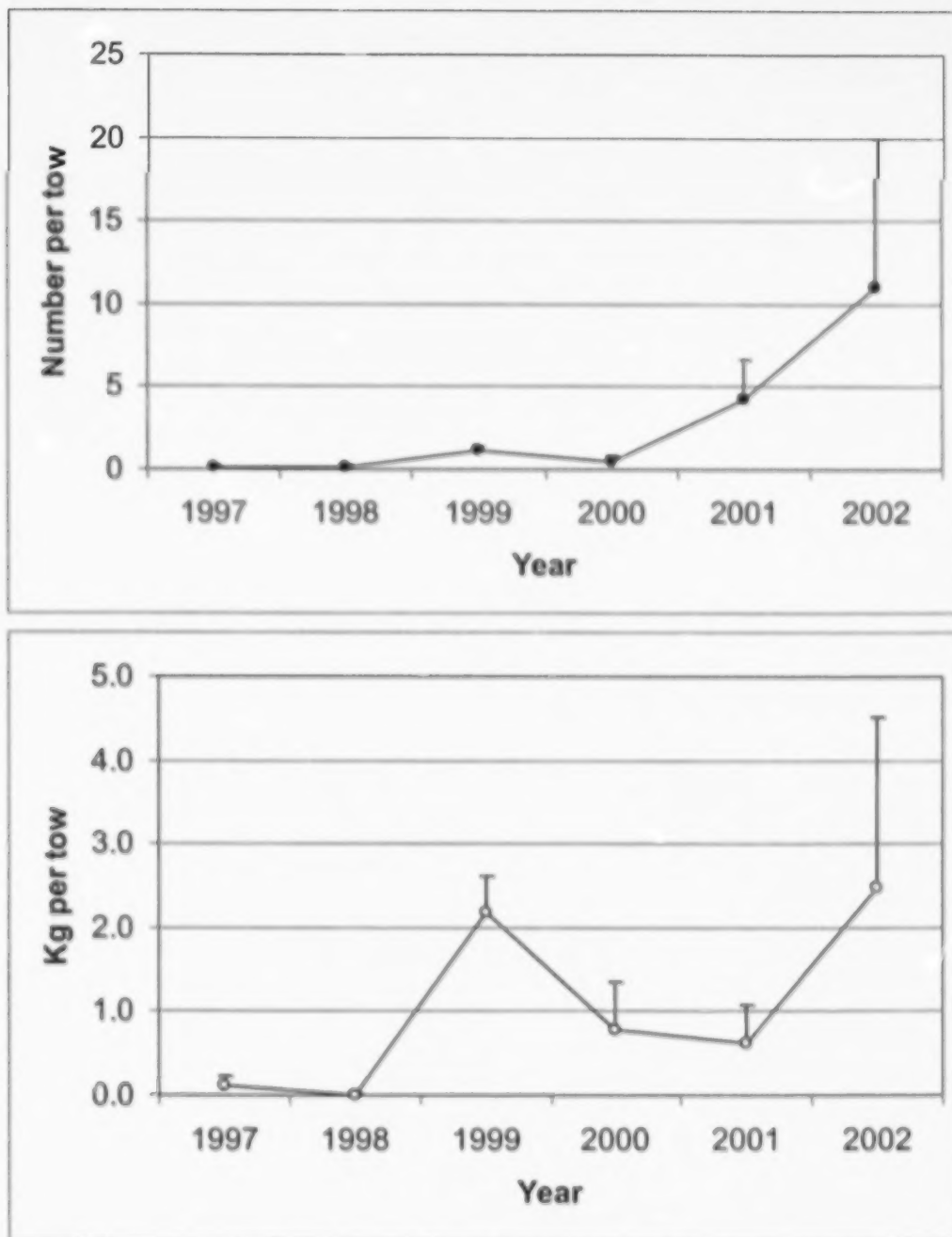


Fig 12 Abundance and biomass of pollock from inshore strata in NAFO subdivision 3Ps.

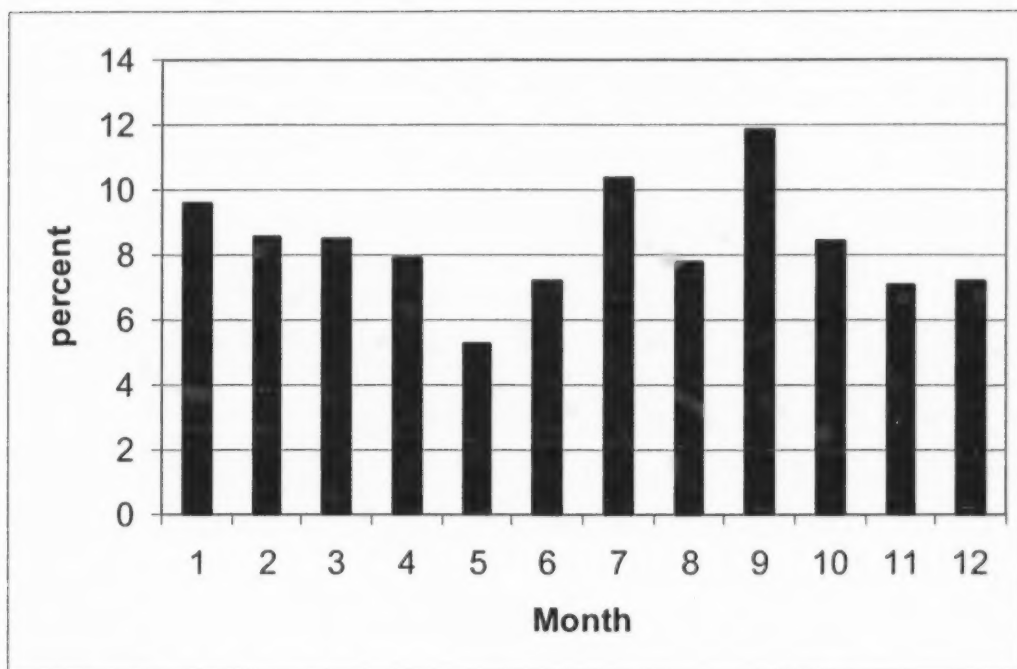


Fig. 13 Historical distribution of pollock catches by month in NAFO subdivision 3Ps 1960-1999.